APPENDIX A

SUMMARIES OF THE BSSC MEETINGS IN CHARLESTON, MEMPHIS, ST. LOUIS, AND SEATTLE

It was noted that many persons in Charleston believe there will eventually be another serious seismic event but do not have any understanding of what it would do. It also was noted that when adopting improved seismic requirements, one must make sure that the average person does not assume that the use of a building code incorporating seismic considerations will eliminate all damage. It must be emphasized that codes only provide for "minimums" and that their purpose is life safety; seismic code requirements generally are aimed at saving occupants by preventing major structural collapse but are not intended to eliminate property damage.

It was stated that often new construction and even renovation work is done by speculative developers who have no lasting association with the buildings and that buyers therefore must be taught what questions to ask about building seismic safety. Further, many building officials need to be made aware of the seismic hazard, especially since many of them do not have engineering training.

It was explained that prior to 1981, even though the county had adopted the Standard Building Code, which includes seismic provisions for new buildings, enforcement was spotty. Since that time, an ordinance ordering their enforcement has been passed. It was noted, however, that because of the historical nature of much of Charleston, replacement of the existing building stock with new and, hence, seismic-resistant structures will occur quite slowly--that is, while a complete turnover of buildings could be expected to occur in about 100 years in most cities, it will probably take about 300 years in Charleston. It was also noted that some contractors prefer not to work in Charleston or in the county but that is simply because it is cheaper to work in nearby areas where there are no codes at all, not because of the seismic requirements of the city and county. Costs were also discussed to some extent and the need for cost-benefit analyses was mentioned.

Considerable discussion focused on the South Carolina Seismic Safety Consortium headquartered at The Citadel. This organization involves 120 representatives from a variety of professions and interest groups; members come from Virginia, North Carolina, and Georgia as well as South Carolina. It was described as a grass roots but coordinated approach to action. The major activities of the consortium involve digesting available information, data and technology and repackaging it in different forms for various audiences (e.g., building community professionals and homeowners). It was noted that the consortium's work has highlighted the need for technical information, vulnerability analyses, and technology transfer. The consortium believes it has three main audiences

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Currently in force in the city of Charleston is the 1982 Standard Building Code (SBC). Although the SBC incorporate ANSI A58.1-1972 for seismic design if required by local building authorities, at the time of the BSSC trial design effort, the city of Charleston building authority recommended that the more recent ANSI A58.1-1982 be used for its seismic requirements.

to consider when preparing educational information: the general public, the building official, and the architects and engineers. It was further noted that the professional community shares in the responsibility to make the public aware.

With respect to the impact of new or improved seismic provisions on regulatory practices, it was stated that the critical stage is design review. Since inspectors only determine if things are being constructed in accordance with plans and specifications, they would require little if any specialized training. If that is not the case, it is up to the building official to take action. In fact, it was suggested that the building officials ought to take someone found to be in violation of the code to court every now and then just to keep everyone on their toes.

Many questions arose about costs, some focusing on those related to actions providing for more than structural integrity. The tentative nature and form of the cost data presented at this meeting led the participants to conclude that the projections of cost derived from the trial designs probably represented minimums. The participants also indicated that they would like to have cost-benefit data as well as comparative data concerning what seismic protection would cost in comparison with protection from other hazards. Some wondered just how much a building owner would be willing to invest in seismic protection when there do not appear to be any financial incentives like those provided by the insurance industry for fire protection. The subject of whether it is a lessening of property damage or life safety that the insurance industry is trying to stimulate was discussed.

Some believed that the NEHRP Recommended Provisions are designed to address the worst case and frequent problem areas like those in California. It was suggested that in areas like those in the East where earthquakes are possible but not probable, use of the NEHRP Recommended Provisions would tend to overprotect low-density areas and underprotect high-density ones.

A discussion of the model codes led one participant to maintain that the best way to implement the NEHRP Recommended Provisions would be to get them incorporated in the model codes. It was noted that local government probably will not act without strong pressure from somewhere and that consensus by the building community is a necessary first step.

The lack of public awareness of the earthquake threat in Memphis was discussed at length. It was stated that even most Memphis building professionals believe the likelihood of life loss due to earthquake is remote. Since the community has limited resources and wants to attract new industry to provide more jobs and a bigger tax base, it is feared that any increase in building costs would prompt businesses to go somewhere cheaper. It also is feared that many economically marginal buildings simply would not be built at all if higher rents would have to be charged.

It was noted that some Memphis buildings are being designed with seismic protection that not required by the local code and that this shows that at least some people recognize the risk and are willing to pay for protection. It also was stated that lenders sometimes require seismic resistant design and that the expanding use of computers and other sensitive electronic equipment may attract tenants to protected buildings and permit premium rents to be charged. (Such determinations, however, are difficult to make in that one does not know whether it is the seismic protection or just the prestige of a new building that is attracting tenants.)

Currently in force in the city of Memphis and in Shelby County is the Standard Building Code (SBC), 1982, with adopted revisions (which include no seismic requirements) and with seismic design requirements excluded.

There was considerable discussion of the negligence/liability issue. It was explained that since a body of scientific knowledge regarding the earthquake threat is available, earthquakes can no longer be considered "acts of God." When the technical literature shows that there is a risk, a building owner or developer or even a regulatory or other community agency might well be considered negligent if an earthquake occurs and fatalities result, even if there is no building code requirement for seismic protection. The issue might be further complicated if some buildings in a community are designed to be seismic resistant. It was noted that this precedent has not yet been tested in court specifically concerning earthquakes but that it has for other natural phenomena.

Great concern was expressed that enactment of seismic provisions for new buildings would necessitate something being done for some existing buildings, particularly schools and other critical or high-occupancy buildings, and that the cost of such retrofit would be extremely high. It also was noted that problems could arise if the general public became overly sensitive to the earthquake hazard. Information about experiences in other places with similar risks was requested.

Some maintained that the life safety issue is of paramount importance and that studies show that many more people would be injured or killed if an earthquake occurred during the day rather than at night. It was noted, however, that few lives have been lost due to earthquakes in the United States during the past 100 years and that people therefore are unaware of or ignore the potential risk, deeming it to be of little significance to them. In addition, although one can speculate about what the damage would be from specific seismic events, no one knows for sure what will happen and this uncertainty contributes to apathy.

With respect to enforcement of seismic code provisions, it was noted that considerable training of building inspectors and probably additional inspectors would be required. One alternative might be to have the designer provide for the inspection.

Questions arose concerning the existing degree of seismic risk actually present and the probabilities of a major seismic event over time. Questions also focused on the sorts of effects to be expected from various degrees of shaking since the geology of the eastern United States is different from that of the West.

Considerable attention was paid to the architectural or nonstructural damage that might occur and whether the NEHRP Recommended Provisions would eliminate such damage in the future. Similarly, concern was expressed about the possibility of fire damage and whether it might not cause far more damage and deaths than structural collapse. Further, many were concerned about the "interface" area and whether necessary critical facilities would be operational after a seismic event even if they did not collapse.

Another major concern was that providing seismic-resistant structures would increase the average building cost and, therefore, a jurisdiction enforcing seismic provisions would be at a disadvantage relative to neighboring jurisdictions that did not enforce seismic provisions. Any resulting increase in rents was deemed to be of special importance since it might well reduce the market and result in a loss of rental income to the owner, tax revenue, and jobs.

Much discussion was focused on public awareness of seismic risk. It was generally believed that awareness is developing among St. Louis building community professionals and, to a limited extent, among the general public. All seemed to believe that what is needed is awareness without alarm and that the public must be made aware that it is not now protected. Many seemed to think that public officials were not convinced that there is a risk. It also was noted that the adoption of seismic provisions for new construction would raise questions concerning retrofit of existing structures; the retrofit issue poses special problems because of the relatively high costs and great number of buildings thought to be involved. Some maintained that clear cost-benefit data are of major importance, but others felt that the economics are somewhat irrelevant since public safety must be guaranteed whatever the cost.

The question of liability also arose. The discussion reflected the fact that it is difficult to reach agreement on how much one is obligated to do. It was pointed out that most large industrial organizations concern themselves with seismic design because they do not want to experience either a shutdown or life loss but that the speculative developer is concerned only about his market and, hence, would resist anything that would increase costs. Many seemed to believe that public officials need to be made aware that the courts most likely would hold them just as liable as a building designer or owner if an earthquake occurred and lives were lost.

Currently in force in St. Louis is the Building Officials and Code Administrator's (BOCA) Basic Building Code with no enforcement of seismic requirements.

Economic incentives to promote seismic design were deemed to be needed. Many thought that the insurance industry should encourage seismic safety the way it does fire safety. Concern by mortgage bankers also was considered important.

The discussion revealed that because Seattle already has seismic provisions in its code, there probably would be little enthusiasm for changing to incorporate the NEHRP Recommended Provisions. In addition, it was noted that any current concern about seismic regulations in Seattle is related to existing construction and enforcement.

With respect to costs, the participants warned those in communities without seismic provisions about several points: (1) incredibly erroneous statements are made about how much seismic protection increases costs, (2) the speculative developer will resist any increase in costs and will be as shortsighted as the buyer will permit him to be, and (3) sometimes a small design change can cost a lot. One participant asked if there were any data available on life-cycle costs for buildings with seismic protection that might reveal secondary benefits and another wondered whether the structure's useful life would be extended.

The fact that some financial institutions are requiring seismic design and insurance was mentioned. Questions arose about whether the insurance industry really recognizes the benefits of seismic protection and whether seismic protection is acknowledged in company rate structures. If so, it was thought that this would be an economic incentive for owners.

Much of the discussion focused on the importance of awareness and education. It was noted that even government officials, scientists, and building community professionals lack a clear awareness of the problem. It was mentioned that the general knowledge many have of the California earthquake situation presents a problem because people assume there is no risk in their area because there is no obvious active fault zone like the San Andreas.

It was stated that public officials and community decision-makers must understand the problem if they are to be able to respond effectively to their constituents once awareness develops. With respect to the general public, they must be made aware of the seismic hazard, but in ways that suggest that there is something they can do about the it.

In a community with no seismic-resistant building requirements, no one group can hope to stimulate action; all sectors of the community must be involved. It also was maintained that the building professionals in such communities must have the tools they need to provide appropriate seismic designs and that there must be a close relationship with the code enforcement agency. In addition, it was noted that the regulatory agency must have enough trained people to provide for review of designs and to ensure enforcement of any seismic provisions adopted.

Currently in force in Seattle is the Uniform Building Code, 1979, including seismic requirements.